

Simple Organics in Comets: Formaldehyde, Methyl Cyanide and Methanol

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Millimeter observations of simple organic molecules in the gas phase have been made via their pure rotational transitions towards various comets, including Hale-Bopp, T7 Linear and Q4 Neat. The measurements have been conducted using the Arizona Radio Observatory 12m telescope over the time period of 1997-2004. H_2CO has been detected in all three comets, while CH_3CN and CH_3OH were found towards Hale-Bopp. Formaldehyde is particularly important because it is a basic building block of simple sugars. Observations of such molecules towards comet Hale-Bopp by Milam et al. (2004) indicate that these objects readily fragment as they pass the sun. In fact, a K-component analysis of CH_3CN in Hale-Bopp implies that the sublimation products exist in a gas with a kinetic temperature of ~ 200 K. Such fragmentation likely results in the deposit of chemical precursors (i.e. "seeds") into planetary atmospheres which may end up on planet surfaces. Molecular abundances of these organic species originating from the comets will be presented and implications for solar system chemistry will be discussed.